TATD Operations Summary Highlights
For Activities conducted March 2017

TATD VEHICLE TESTING

- The number of vehicles that Certification brought in March for Compliance Testing was well below the target and In-Use Testing was above the target. Combined they remain below target for the year.
- Paired data FE offsets for the month of March consisted of 18% of FTP's and 30% HWY's resulting in a FE offset > 3%. Average offsets for the FTP were 0.3% and 0.9% for the HWY. The MFR FE being higher on the FTP and lower on the HWY.
- Total Vehicle tests were 381 tests.
- HEARO Program: Testing continues on D005 with a Ford F150 and Chevrolet Malibu
- CFI Program: Testing on D001 with a Chevrolet Malibu.
- Certification Experimental vehicles continued testing last month for defeat device investigation. Vehicles included: Mercedes Sprinter, Dodge Ram, Mazda CX-5, VW Jetta (2), and VW Passat (2)

ENGINE TESTING SUPPORT – Heavy Duty

- **HD01: (**HD1 ran 6.1 hours in March for test development.) Horiba fixed the EGR analyzer and reassembled the Dilute OVN. Work continues on addressing PSU computer crashes. The Vaisala weather station wiring was changed to allow 1065 calibrations. Calibrations and programming are being done to prepare for ASD's round robin testing of the ISX15 engine. A&D worked on the transient testing reports. Paul DeKraker created Test 5 to run ASD's fuel maps using i-Test.
- **HD02: (**No engine in cell. Total dyno run time for March 2017 : 0.0 hours)
  Test cell operation was shut down all month for CVS upgrade project.
- **HD05: (**We ran the ASD Cummins ISX engine 46.9 hrs.)
  This is for ASD's fuel mapping study
- **NRSI –**
  - **Dyno 13 (**5 Hours)
    Confirmatory Test – Suzhou Erma EF: HSEMS.4592EM
    Confirmatory Test – Chongqing Maifeng EF: HCMGS. 2702EM
  - **Dyno 14 (**14-Hours)
    Confirmatory Test – Suzhou Erma EF: HSEMS.4592EM
    Confirmatory Test – Chongqing Maifeng EF: HCMGS.2702EM
    Confirmatory Test – Chongqing Maifeng EF: HCMGS.2702EM
    Confirmatory Test – China Xingyue EF: HCXGS.1501XY
    Confirmatory Test – China Xingyue EF: HCXGS.1501XY
    Confirmatory Test – Loncin EF: HCGPS.2121GS
- **PEMS Testing (48.98hrs**) on the following test articles:
  1. MB Sprinter 2, LDVC Testing
  2. VW Passat (Gen 2 M/T), LDVC Testing
  3. GMC Box Truck, GECC Testing
  4. Chevy Equinox, LDVC Testing
  5. Ford Explorer, ASD SOAK Study/Equipment Evaluation
  6. Chevy Colorado, LDVC Testing

NCAT

1) ***Vehicle Testing Update***
   a. **2015 Volvo S60:** SwRI has gotten the DEVCON robot driver software fully functional. It has been configured to be auto synched with cell in Dyno 2.
   b. **Testing:** The testing of the MY2016 Acura ILX w/DCT and torque converter is nearly complete.
   c. **Future plans**: NCAT is putting together a list of potential new benchmarking projects in coordination with ASD to support the reopening of the MTE and future LD GHG standards past 2025. Options include, new Toyota TNGA Atkinson engine/vehicle, new Hyundia Atkinson engine/vehicle, and the MY2017 Ford F150 with 3.5L EcoBoost engine and 10-speed AT.
   d. **Diesel vehicles:** NCAT has rented another Ram Eco-Diesel, and has continued the rental of a Mercedes GL350 (previously rented by CD) for chassis testing. Test and analysis plans are being developed for these vehicles and will help NCAT quickly learn about compliance issues of in-use vehicles.

2) ***Engine Testing Update***
   a. **Honda CVT Testing:** Currently benchmarking Honda Civic CVT in cell 7.
   b. **Mazda CX-9 Testing:** Prepping Mazda CX-9 2.5 turbo for benchmarking. Install in cell 9 in 2 weeks.
   c. **PSA 1.6L engine mapping:** SwRI has benchmarked the engine with stock, LPEGR, on both Tier 2 and Tier 3 fuels. Data from SWRI nearly complete.
   d. **GT power modeling:** Models of PSA 1.6L and Honda Civic 1.5L engines are nearly complete. SwRI is planning to give EPA staff GT power modeling training.

3) ***Modeling Update***
   a. REVS3 buildup:
      - Completed replacements of signal logging infrastructure within the model
      - Continued to make improvements to REVS3 platform data management and optimization
      - Improved REVS3 plotting / engine scaling support for engines with cylinder deactivation
      - Completed energy audit including by test phase for all powertrain types

   b. Engine map documents:
      i. Preparing engine process documents for Tier 2 vs Tier 3 fuel comparison.
      i. Preparing data packet structure for NCAT's publishable ALPHA Input Files with full final Engine Maps to be released on EPA website.

   c. Test Cell Support:
      - Added new framework for engine fuel mapping in HD1 iTest system following the existing test structure.
      - Updated Cell 7 iTest to allow roadload simulation to for CVT testing.

4) ***Other***
   a. **MTE/LD GHG support:** Continuing support to ASD for technical meetings with stakeholders – delivered modeling results for Toyota meeting.
   b. **HD NOx Rule support:** Beginning technical testing & development support & advice to ASD HD team.
   c. **NCAT Vehicles on loan to support various programs:**
      i. **HEARO:** Multiple vehicles on loan (Mazda 3, F150, Acura ILX)
      i. **Signature Device Testing:** Multiple vehicles on loan (Ram HFR, Altima, BMW X5)
      ii. **CD/DOJ Diesel Testing:** Vehicle on loan (FCA Ram EcoDiesel)

iii. **Real World Fuel Economy Testing:** Vehicle on loan (Malibu ECO)
iv. **CFI Canister Loading:** Vehicle on loan (Malibu)

5) ***NCAT Transition Planning***

a. NCAT is continuing to balance new work for later 2017 with the recent MTE announcement of the continued need for MTE support. Currently, NCATs potential portfolio for work includes projects for: MTE close-out, MTE follow-up, future LD GHG regulation, HD NOx regulation, in-use testing for CD, and potential in-use ALPHA/GEM model development.
b. Active brainstorming meetings with Lisa Snapp's team from TCD about future lab and in-use testing needs for CAVs.
c. Participating in EV credit extension analysis with ASD
d. Exploring a partnership with ASD to analyze EV VMT projections and cost parity issues.

TATD QUALITY

- **TEST PACKET AUDITS**
  - **Vehicle Testing -** Performed 38 Certification, 48 In-Use & 21 Certification special audits; above average qty
    - 7 errors found by CDRT, 7 additional errors detected by QST; tailpipe temperature error message not addressed, prep key-off time greater than one hour, odometer reading before and after the prep was the same, incorrect RLD report in packet, RLD report did not have a configuration stamp, incorrect test number on highway fuel ticket, FTAG not populated on highway parameter form
  - **Engine Testing -** Performed 0 Heavy Duty Certification audits. 0 errors found by QST
- **VOID / VARIANT ANALYSIS**
  - **Vehicle Testing -** 8 voids / variants; 7% of compliance testing total, below average percentage
    - 1 Personnel void; drive trace violation greater than 3 seconds
    - 1 Personnel variant; 10 minutes between pairs of UDDS not maintained
    - 1 Equipment variant; span check failed for CH_4 and HC
    - 3 Manufacturer voids; operator could not determine if start sequence was successful, vehicle failed SOC < ±1% criteria, US06 had check engine light on
    - 2 Facilities voids; power failure (2x's)
  - **Engine Testing -** 1 variant in Small Engine; N_2O analyzer drift check span not recorded
- **CONCERNS, IMPROVEMENTS, NCWs & CORRECTIVE ACTIONS**
  - 1 new Corrective Action added for propane naming issue; 3 open; 5 closed – 3 from internal audit
  - 1 new Non-Conforming Work item for calibration of PEMS equipment; 2 open; 2 closed
  - 3 Opportunities for Improvement & 0 Preventive Action currently open; 0 new OFIs; 9 closed from audit
  - 0 new Customer Feedback items; 0 open; 0 closed
- **QUALITY MANAGEMENT SYSTEM**
  - 451 total approved and released documents, added 1 new Advanced testing work instruction and 3 traceability instructions; performed 18 document reviews; documents past the scheduled review due date increased to 23
- **STAFF OBSERVATIONS**

- Completed 7 staff observations; 2 new traceability instructions, 1 new Advanced work instruction, 3 process revisions – 1 in IO, 1 in Vehicle testing and 1 in Engine testing, 1 IO demonstration of competency

- **ISO-17025 TEST METHOD VALIDATION STATUS**
  - Several sites indicate there has been progress made within specified steps of the process as indicated by the green "Moved Forward" and blue "Complete" indicators; CTTF - Cold Diesel FTP completed the final steps in the testing documentation and data validation phases

IMC –

IT Infrastructure Health
March 2017

Service Availability

PMN Service Availability by Month

Service	Mar	Feb	Jan
Data Backup Appliance	100%	100%	100%
DHCP Server * Controlled by OEI	99.94%	99.89%	99.92%
IP Network * Power Outage in 3068	99.97%	99.05%	99.99%
SAN Storage * Power Outage in 3068	99.93%	99.63%	99.51%
Storage Network	100%	100%	100%
VMWare Cluster * Minor system outage, corrected	99.99%	99.99%	98.84%
Windows Servers	99.83%	99.99%	100%

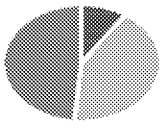
LNS Service Availability by Month

Service	Mar	Feb	Jan
Active Directory	99.98%	100%	100%
IP Network * Outage due to failed switch update	96.94%	100%	100%
SAN Storage	100%	100%	100%
VMWare Cluster	100%	100%	100%
Windows Servers * Outage due to failed switch update	99%	99.99%	99.95%
Oracle Services * Outage due to failed switch update	96.94%	100%	100%

Information Security
Vulnerabilities Mitigated

Vulnerabilities	Low	Medium	High	Critical
March	60	233	202	45
February	56	107	18	44
January	7	35	142	4

Exploitable Vulnerabilities Mitigated



Critical High Medium

Detected vulnerabilities are addressed on a continuous basis. Utilizing several risk mitigation and correction tools, IMC ensures the Confidentiality, Integrity, and Availability of all NVFEL data.

There are no security incidents to report for the month of March

IMC Key Achievements for March

- Completed Phase 2 of the LNS network migration project. All LNS switches are now part of the modern network design. LNS performance has increased 1000% from 100 megabytes per second to 1000 megabytes per second (1GB).
- Participated in Agency wide training utilizing Xacta. Training focused on how other offices report System Security to SAISO.
- Converted the LNS documentation database to Microsoft OneNote. Only 2 IMC databases remain on Lotus Notes at this Time.

IMC Planned Project Completion for April

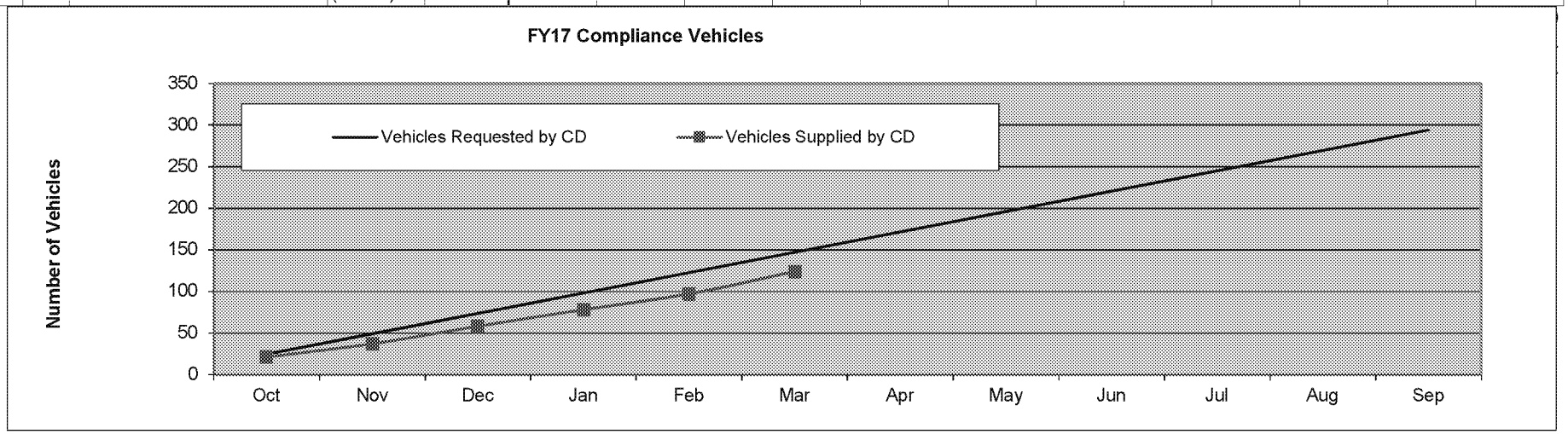
- Deploy an IP Address management system (IPAM) for the LNS Network. IPAM will allow for greater control over resources being assigned to users.
- Druva, the tested desktop backup software will be placed in production. All OTAQ computers will now benefit from a strong backup solution.
- Scale the MOVES Grid system to 100 Servers. Currently the MOVES Grid is at 16 servers, by the end of the month the Grid will contain 100 servers to be used for modeling.
- For license tracking, SNOW software will be installed and configured. Staff will have the ability to better manage and track software resources.

TATD Overtime/Comptime

- 34.75 hours of approved overtime in March (03/01/2017-03/31/2017)

NVFEL OPERATIONS METRICS -- VTC/FCC TESTING

			units	Target	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
VEHICLE TESTING (Vehicle Count)																
	Total Number of CD Vehicles		(count)	**294**	21	16	21	20	19	27						
		Cumulative	(count)		21	37	58	78	97	124						
		Annualized percent	(%)	100	86%	76%	79%	80%	79%	84%						
	Number of Cert Vehicles		(count)		10	6	8	8	8	11						
		Cumulative	(count)	**150**	10	16	24	32	40	51						
	Number of In-Use Vehicles		(count)		11	10	13	12	11	16						
		Cumulative	(count)	**144**	11	21	34	46	57	73						



FUELS TESTING (Test Count)			**2000**													
	Test fuel		500	10	10	40	30	10	70							
	Correlations		1000	91	42	77	91	119	91							
	All Other		500													
		Audit		72												
		Oversites		90		117	288	90	306							
		Diesel Enforcement														
		Bio-Diesel			8											
		Gasoline Enforcement		36				18								
		Exhaust (E-85) Samples Carbonyl Samples						28	126							
		Exhaust (E-85) Samples Alcohol Samples						40	100							
		Program Results		64	32	48	48	96	54							

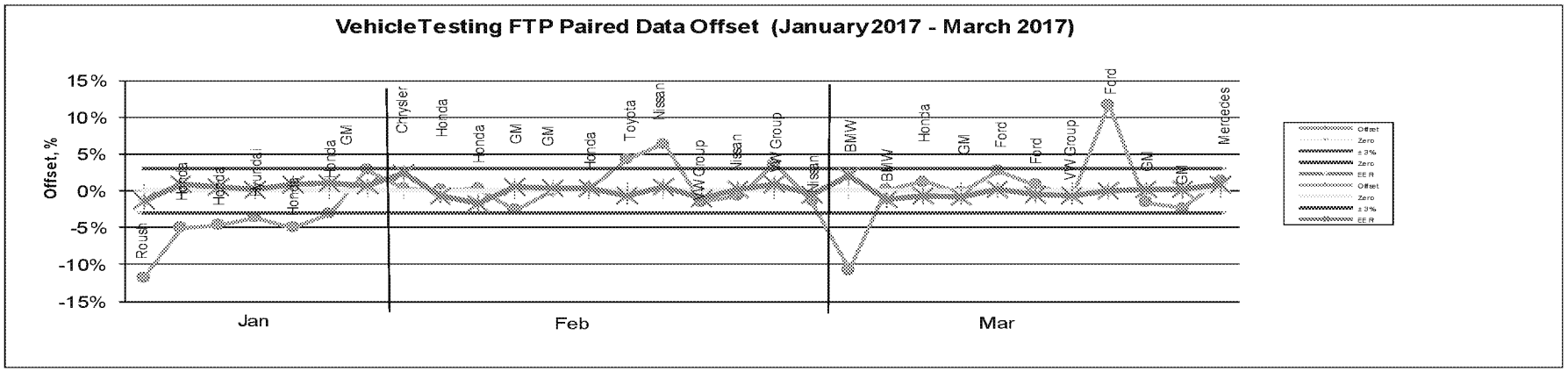
NVFEL OPERATIONS METRICS -- VTC/FCC TESTING

			units	Target	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
VEHICLE TESTING (Test Count)				**1300**												
	Total Monthly Vehicle Tests		(count)													
		D001	(count)		5	16	46	49	42	34						
		D002	(count)		41	18	16	66	3	56						
		D005	(count)		46	55	48	60	56	73						
		D006	(count)		41	56	44	44	56	79						
		D329	(count)		0	0	0	0	0	0						
		CTTF	(count)		69	63	0	16	19	68						
		HTTF	(count)		19	19	32	43	38	43						
		HD Chassis	(count)		21	41	11	6	52	23						
		SHED Evap Tests	(count)		2	5	5	4	4	5						
	FTP Tests (>3% FE offset)		(count)		4	2	2	6	3	2						
		Rate (# /FTP Paired Data)	(%)	lower	33%	50%	33%	75%	27%	18%						
	Repeat FTP Tests (>3%FE)***		(count)		0	0	0	0	1	1						
		Rate (# /FTP Paired Data)	(%)	lower	0%	0%	0%	0%	9%	9%						

* Certification and In-use

** Regulatory, development, LOD and quality

*** # of Repeat Tests due to exceeding ±3% FE (applies to Certification Vehicles only)



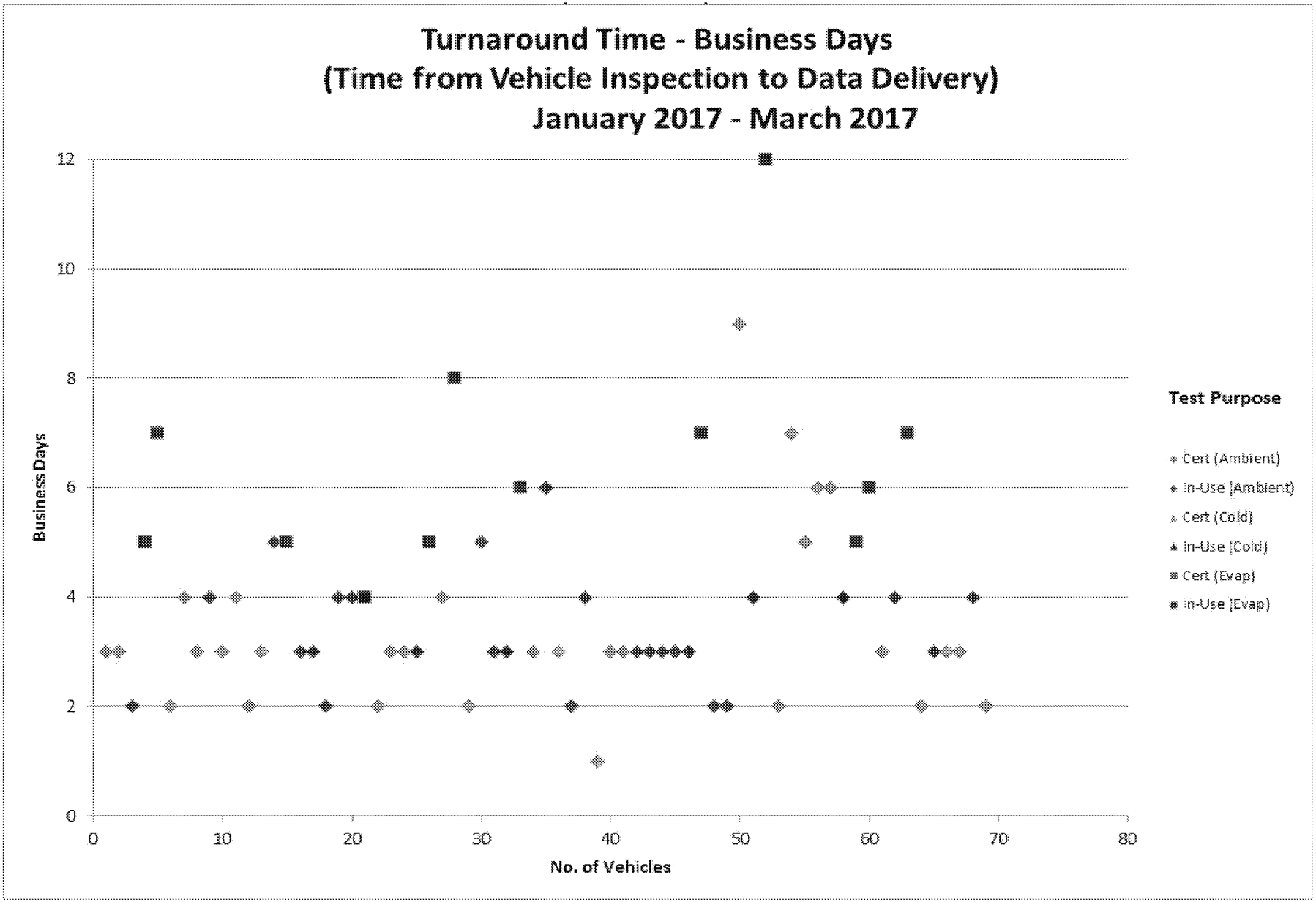
INTERLABORATORY COMPARISONS										
Vehicle Compliance		completed			ongoing					
Fuels COR	#Pass / Total	no samples			no samples					
Fuels consensus	#Pass / Total	5 / 5	5 / 5	5 / 5	5 / 5	5 / 5	4 / 4			
Fuels corporate	#Pass / Total	6 / 6	6 / 6	6 / 6	6 / 6	6 / 6	6 / 6			

4th 2016 Quarter Vehicle - Tier 2 gasoline SC03 vehicle study

1st 2017 Quarter Vehicle - Tier 2 gasoline vehicle study

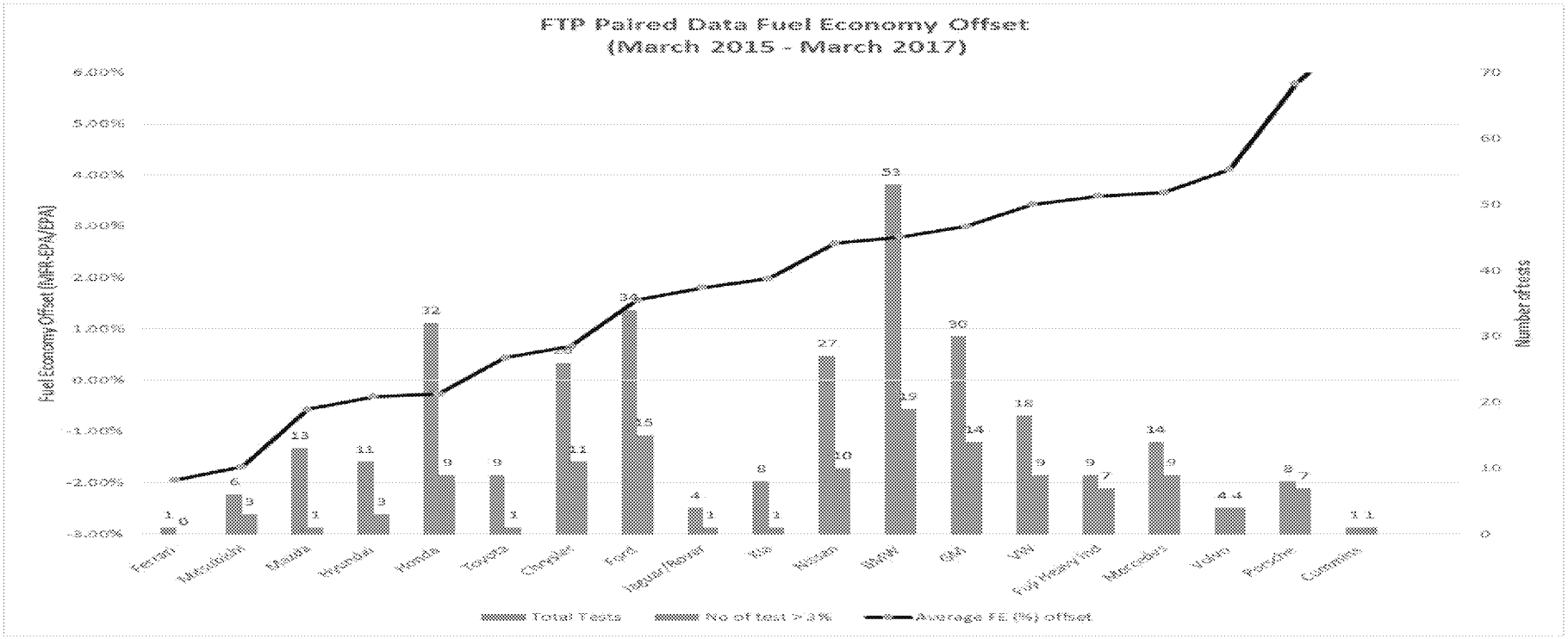
NVFEL OPERATIONS METRICS -- VTC/FCC TESTING

			units	Target	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep



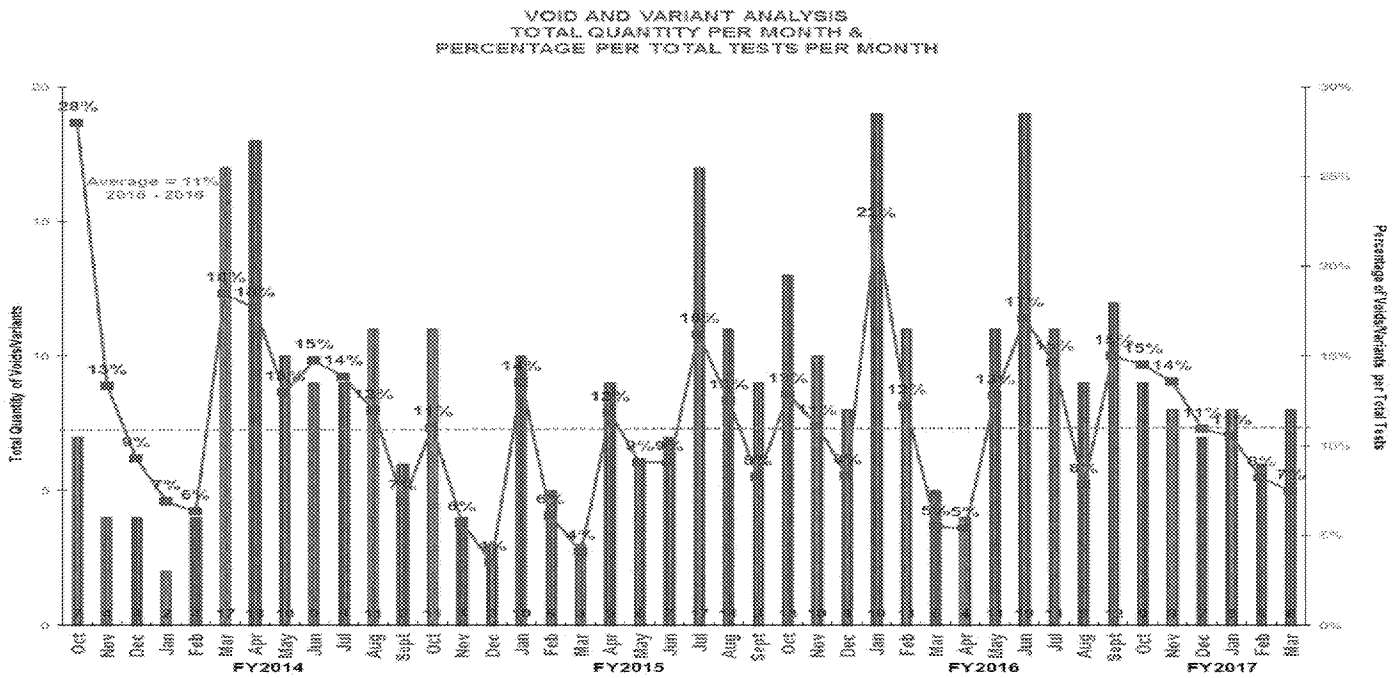
NVFEL OPERATIONS METRICS -- VTC/FCC TESTING

			units	Target	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep



NVFEL OPERATIONS METRICS -- TATD QUALITY

			units	Goal	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
TEST PACKET AUDITS - COMPLIANCE VEHICLES																
	Quantity of Completed Compliance Test Packet Audits															
		Certification Vehicles	(count)		35	45	52	46	55	29	25	19	22	31	34	38
		In-Use Vehicles	(count)		34	38	46	27	53	38	32	32	39	35	32	48
		Certification Special	(count)		5	3	13	2	7	13	5	8	3	10	7	21
		Errors Found by CDRT	(count)		9	14	20	8	6	4	9	1	11	3	4	7
		Errors Found by QST	(count)		4	10	2	10	19	9	6	8	9	5	4	7
VOID / VARIANT ANALYSIS - COMPLIANCE VEHICLES																
	Total Quantity - Void / Variant		(count)		4	11	19	11	9	12	9	8	7	8	6	8
	Major Category Analysis															
		Personnel (100s)	(count)		1	5	0	1	0	6	1	2	3	0	2	2
		Equipment (200s, 700s)	(count)		2	6	12	4	4	5	7	3	2	6	2	1
		Manufacturer (400s)	(count)		0	0	5	4	5	0	1	2	1	2	2	3
		Facilities (300s)	(count)		0	0	0	2	0	1	0	1	0	0	0	2
		Contractor (500s, 600s)	(count)		1	0	0	0	0	0	0	0	1	0	0	0



TEST PACKET AUDITS - COMPLIANCE ENGINES																
	Quantity of Completed Test Packet Audits															
		Heavy Duty Engine	(count)		--	--	--	--	--	2	12	13	5	0	0	0
		Errors Found by QST	(count)		--	--	--	--	--	6	18	7	1	0	0	0
VOID / VARIANT ANALYSIS - COMPLIANCE ENGINES																
	Total Quantity - Heavy Duty		(count)		--	--	--	--	--	5	1	2	0	0	0	0
	Total Quantity - Small Engine		(count)		--	--	--	--	--	0	0	0	0	1	0	1

NVFEL OPERATIONS METRICS -- TATD QUALITY

			units	Goal	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
CONCERN IDENTIFICATION AND RESOLUTION ITEMS																
	Corrective Actions															
		New	(count)		0	0	0	0	1	1	2	3	8	0	0	1
		Open	(count)		3	1	1	1	2	3	5	7	15	11	7	3
		Closed	(count)		1	2	0	0	0	0	0	1	0	4	4	5
	Nonconforming Work Items															
		New	(count)		0	1	0	0	0	0	0	2	0	0	1	1
		Open	(count)		3	4	2	2	2	1	1	3	3	2	3	2
		Closed	(count)		0	0	2	0	0	1	0	0	0	1	0	2
	Days Open Category															
		Average Days Open	(count)		149	149	119	140	123	95	79	40	44	68	87	102
		Median Days Open	(count)		127	149	148	169	137	64	40	21	34	61	81	112
		New 0-14 Days	(count)		0	1	0	0	1	1	2	5	8	0	1	2
		3 Months 14-90 Days	(count)		0	0	1	1	1	1	2	4	9	11	6	0
		6 Months 90-180 Days	(count)		4	2	2	1	0	1	1	1	1	1	2	2
		Long Term > 180 Days	(count)		2	2	0	1	2	1	1	0	0	1	1	1
	Opportunities for Improvement / Customer Feedback / Preventive Action															
		New	(count)		0	0	1	2	1	0	0	13	12	0	0	0
		Open	(count)		5	5	4	6	5	5	5	17	29	26	12	3
		Closed	(count)		8	0	2	0	2	0	0	1	0	3	14	9
		Long Term > 180 Days	(count)		0	0	0	0	0	0	0	0	0	0	0	0
		Total >180 Days	(count)	0	2	2	0	1	2	1	1	0	0	1	1	1
QUALITY MANAGEMENT SYSTEM																
	Documentation - Scheduled 18 Month Reviews (QSP, WI, TI, PD, AM)															
		Approved & Released	(count)		437	439	443	444	443	446	446	445	445	445	447	451
		Reviewed & Approved	(count)		22	36	39	36	22	23	38	24	38	32	30	18
		Past Review Date	(count)		20	28	40	30	31	36	23	27	28	23	20	23
		Past Due Percentage		≤ 5%	5%	6%	9%	7%	7%	8%	5%	6%	6%	5%	4%	5%
STAFF OBSERVATION REVIEWS																
	Quantity of Observations		(count)	6	3	5	6	6	8	2	8	5	2	8	7	7
	Category Analysis															
		Center Director Request	(count)		0	0	1	1	0	0	2	0	0	1	1	1
		Process Revision	(count)		1	2	0	0	3	0	5	2	1	1	0	3
		New Document	(count)		2	2	4	2	3	0	1	1	0	3	2	3
		Concern Verification	(count)		0	0	0	0	0	0	0	0	0	3	4	0
		Random Selection	(count)		0	1	1	3	2	2	0	2	1	0	0	0

NVFEL OPERATIONS METRICS -- TATD QUALITY

	units	Goal	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
ISO-17025 TEST METHOD VALIDATION STATUS														
Overall % Completion:														
HTF - SC03			10%	33%	41%	54%	81%	95%	95%	97%	97%	97%	97%	97%
LD D001 PM Upgrade			39%	42%	42%	42%	52%	52%	52%	52%	52%	52%	52%	52%
CTTF - Diesel Ambient			97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%
CTTF - Cold Diesel FTP			78%	78%	78%	78%	78%	78%	78%	92%	92%	92%	92%	97%
HTF - Gasoline Ambient			69%	69%	72%	87%	97%	97%	97%	97%	97%	97%	97%	97%
HTF - Diesel Ambient			69%	69%	72%	82%	97%	97%	97%	97%	97%	97%	97%	97%
PM Room - Auto Handler			82%	82%	82%	82%	85%	85%	85%	85%	61%	61%	61%	61%
LD D329 - 1066 Upgrade			--	--	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
HD03 - Mid Range Diesel			--	--	--	--	--	--	--	--	--	--	5%	5%

ISO-17025 TEST METHOD VALIDATION TRACKING MATRIX

Process Phase Completion & Monthly Progress Indicator

Moved Forward / No Change / Delay / N/A / Complete

Test Site - Scope	Equipment Integration & Configuration	Progress	Test Process Evaluation	Progress	Data Management Systems Integration	Progress	OFR Checklist	Progress	Testing Documentation	Progress	Data Validation	Progress	Uncertainty Assessment	Progress	Comments:
HTF - SC03	5 of 5		7 of 7		6 of 6		5 of 5		10 of 11		2 of 2		1 of 1		
LD D001 - PM Upgrade	3 of 5		1 of 1		5 of 8		2 of 5		3 of 11		2 of 2		1 of 1		
CTTF - Diesel Ambient	5 of 5		8 of 8		7 of 7		5 of 5		10 of 11		2 of 2		1 of 1		
CTTF - Cold Diesel FTP	5 of 5		8 of 8		6 of 6		4 of 5		11 of 11		2 of 2		1 of 1		
HTF - Gasoline Ambient	5 of 5		7 of 7		6 of 6		5 of 5		10 of 11		2 of 2		1 of 1		
HTF - Diesel Ambient	5 of 5		7 of 7		6 of 6		5 of 5		10 of 11		2 of 2		1 of 1		
PM Room - Auto Handler	5 of 5		1 of 1		0 of 8		4 of 5		7 of 11		2 of 2		1 of 1		
LD D329 - 1066 Upgrade	0 of 5		1 of 7		0 of 8		0 of 5		0 of 11		1 of 2		1 of 1		
HD03 - Mid Range Diesel	0 of 5		0 of 7		0 of 8		2 of 5		0 of 11		0 of 2		0 of 1		